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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/615,081
Filing Date: July 08, 2003
Appellant(s): RAHMAN, M. MIZANUR

Craig A. Slavin
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 7/20/2006 and 8/14/2006 appealing from the Office action mailed 1/26/2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief, substitute pages 2-4 filed 8/14/2006 is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,240,317	VILLASECA et al.	5-2001
6,456,256	AMUNDSON et al.	9-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims: Claims 1-12, 22-28, 30 and 32-38 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Villaseca et al. (6240317), substantially as set forth in the final Office action mailed 1/26/2006.

Specifically, regarding Claims 1-3,5,22,25-28,30 and 32-38, Villaseca et al. show in Fig. 7, for example, an RF telemetry antenna system for communication between an external programmer and an implantable medical device, where the system comprises an implantable medical device 122 having a housing made of metal such as titanium and of a cylindrical form and defining an internal volume, and a dielectric housing portion 138 defining an internal volume, a self-resonating, monopole antenna 124,wire 134,136 with free end and connection end 126 contained within the internal volume defined by the dielectric portion 138, an internal TX/RX (col. 9, lines 15-26) operating in the 400 MHz. band and comprising a tissue stimulation circuit, where the antenna has an elongate form, folded at least once and conforms with the inside of the housing 138, and the connection end 126 has the shield 124 of the antenna connected to the conductive housing 122 defining a ground reference forming a ground plane as claimed. Therefore, the skilled artisan would have found it obvious that the internal transceiver circuit is grounded to the housing, at least through the shield of the coax. It is known that there are two conductors between the antenna and transceiver. In this case there are coaxial conductors defining the feed line. A center conductor would be connected to

the transceiver circuitry and the shield conductor is connected to the ground of the transceiver, as in a ground conductor etched on the printed circuit board of a transceiver. Thus, the shield of the coaxial cable would extend from the transceiver circuit (board) to the connector feed-through 126, or the ground of the transceiver is connected to the conductive housing 122. In other words, there must be a ground connection from the container 122, either at the feed-through 126 to the transceiver circuitry inside the container 122 because antennas have two conductors from the RF circuitry of the transceiver. In either case the connection is within the housing, either at the feed through or inside the housing near the transceiver circuitry. Such a ground connection would never be avoided, as recognized by the skilled artisan because of the required two conductor feed line from transceiver ground and circuitry. Additionally, a ground internal the housing, connected to the transceiver would have been obvious to the skilled artisan, in order to eliminate any ground loops and spurious radiation inherent in circuits.

Further regarding Claims 2 and 3, the transceiver is formed on a p.c. board and the housing 138 is epoxy/plastic and the housing 122 is titanium.

Further regarding Claims 22 and 24, the particular geometry of an antenna and any change therein, is obvious to the skilled artisan. Thus, the skilled artisan would have found it obvious to employ the center conductor of the antenna that extends along the side of the housing back toward the feed point. Such an arrangement is dependent upon the radiation beam pattern desired, the impedance match and other

radiation/antenna characteristics, particularly since no unexpected results are evident in the claims.

Regarding Claims 4 and 6-8, the permittivity value of 3.6 for the housing, specific wire composition, size and gauge therefor, are all obvious to the skilled artisan to achieve when selecting stock shelf materials in a particular design application used in the implantable device.

Further regarding Claims 9,10,22 and 24, the shield 124 is disposed in an arc and the center conductor 134 is in a parallel arc, folded to provide maximum separation between housing and antenna.

Regarding Claim 11, the frequency of operation is strictly an FCC-mandated allocation, made obvious by the skilled artisan using antenna frequency scaling. Antennas are adjusted in length depending upon frequency of operation. For example, if the frequency of operation is lowered, the antenna length is made longer.

Regarding Claims 12 and 23, shaping of the housing is always considered obvious to the skilled artisan to fit a particular environment, absent any unexpected results.

Claim 29 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Villaseca et al. (6240317) in view of Amundson et al. (6456256).

Regarding Claim 29, no specific teaching of "a spinal cord stimulation circuit" appears to be suggested in Villaseca et al. However, such a circuit within the housing falls under the class of implantable medical devices, taught by Villaseca et al. Amundson et al. teach that the implantable device disclosed thereby utilizes a curved/arcuate, monopole

antenna with the housing used as a ground plane, where the antenna is connected to circuitry within the shielded housing for neuromuscular stimulation. Spinal cord stimulation falls under such use. Thus, it would have been obvious to the skilled artisan to include such circuitry in the housing of Villaseca et al.

(10) Response to Argument

Several issues have been raised in the Brief and will be addressed in the order that they appear as follows.

On pages 6-7 of the Brief, section "A" sets forth the legal standard for obviousness rejections by citing a court case and emphasizes even when obviousness is based on a single prior art reference, there must be a showing of suggestion or motivation to modify the teachings of that reference, and the citation of MPEP 2143.01. The single reference to Villaseca shows the environment of the implantable medical device and Figure 7 therein is primarily used in the obviousness rejection. Appellant illustrates the major elements of the device in the last paragraph on page 7 of the Brief, section "B".

The arguments to Claims 1-12 and 30 begin in section "C" on page 8 of the Brief; and in the first paragraph therein, Appellant points out the primary argument and the claimed element that the internal transceiver has a ground reference located within the metal housing portion 122 that is connected to the metal housing, and the portion acts as a ground plane. However, there is a ground reference within the housing portion 122. The antenna is made of a coaxial cable with braided shield conductor 124 and a center conductor 134 extending beyond the shield conductor. In column 9, lines 27-47 describe

the connections of the antenna and housing and internal circuitry, and particularly the inner conductor 134 is coupled to a feedthrough 126 and in turn connected to the internal circuitry of the transceiver within the housing 122. Additionally, it is taught that the shield is of a specific length measured from the point of connection of the cable to the feedthrough 126. It is not specific that there is no outer coaxial conductor connected within the housing 122. However, column 9, lines 56-61 make it clear to the skilled artisan that the coaxial cable is coupled to the feed through 146 (Fig. 8) which in turn is coupled to the transceiver within the device 142 and having a braided shield 144 coupled to the device enclosure 142. These elements correspond to similarly numbered elements of Fig. 7. A skilled artisan would have found it obvious that the internal transceiver must have two conductors, one for the inner signal line and the other for the shielded conductor connecting the ground of the transceiver. These connections are widely accepted in the radio frequency arts. Transceiver RF connections have generally a 50 ohm impedance that includes a coaxial terminal. The transceiver has a ground which is part of the coaxial cable which passes through the feedthrough 126. Since the cable is passed through the feedthrough 126, then there is an internally connected ground reference within the metal housing and connected thereto, as claimed. Claims 1-12 and 30 merely call for an internal ground connection connected to the housing. The feedthrough provides the connection of the ground reference which all transceivers have at their RF port. A skilled artisan would certainly find such a teaching to be obvious when Villaseca suggests that the cable is connected through the feed through to the transceiver at column 9, lines 56-61. Regarding the arguments by Appellant concerning

the "ground loop", such grounding of RF circuits is a matter of good engineering practice. An example of a detrimental ground loop is feedback in a circuit which causes undesirable effects. Additional grounding is provided for eliminating such feedback and spurious RF radiation within RF circuits. In the antenna arrangement of Villaseca the shield housing is at ground potential, the housing is connected to the shield of the coaxial cable and the cable extends inside the housing and connects to the RF circuitry of the transceiver. Thus, no spurious radiation results within the housing because the feedline is shielded by the braid surrounding the inner conductor. Conversely, if the inner conductor was not surrounded by the braid inside the housing then it would act as a radiator within the housing and cause spurious radiation to the transceiver. Good grounding is obvious to the skilled artisan and since it is suggested that the coaxial cable is coupled to the feedthrough with a specific ground connection, at the feedthrough, connected to the housing, then the claimed language is met by these connections. The internal ground reference is the continuation of the shield within the housing and connecting the ground of the transceiver.

The arguments regarding Claims 22,23,25-29 and 32 are found in Section "D" of the Brief, pages 9-10. Appellant emphasizes the main elements of Claim 22 in the first paragraph of section "D" in bold. Villaseca does not specifically show the free end of the antenna closer to the connection end than at the fold. However, a skilled artisan would have found it obvious to extend the free end of the antenna around the housing in the same manner as the first fold so that the free end of the antenna closer to the connection end, particularly when a lower frequency is employed. A skilled artisan

knows that when lowering the frequency of operation of the device, the antenna elements must be lengthened, which is called frequency-scaling. It would have been obvious to lower the frequency, lengthen the antenna to the extend of bending it around to the opposite side to the side appearing in Fig. 7 and parallel to the conductor 134. Extending the end of the antenna to a point near the arrowhead of numeral 120 in Fig. 7 of Villaseca provides an end closer to the connection. Such a condition results when the frequency is lowered. Extending the antenna along the opposite side shown in Fig. 7 also changes the radiation pattern in the same manner as that shown in Figures 3 and 4 of Villaseca where multiple antennas are employed for diversity switching, where the signals are received or transmitted in multiple directions, where the housing provides a ground plane which redirects the signal away from the housing. The length of the antenna element does effect impedance. For example, a one wavelength antenna looped around the housing provides a higher impedance than the monopole show in Fig. 7. Certain systems require higher impedance, different directional radiation patterns (as in Figures 3 and 4 of Villaseca). Evidence for various antenna geometries is found within the Villaseca patent, when comparing Figures 1A,1B,2A,2B,3,4,6A,6B,7 and 9, all of which provide a different antenna type, providing various radiation patterns that are not the same. Evidence of obviousness, for changing antenna length, arrangement and geometry, therefore, lies within the various embodiments. All of these arrangements provide different results by comparison.

Regarding Appellant's remarks on page 10 of the Brief, second paragraph, no unexpected results have been shown when providing a free end closer to the

connection point. A skilled artisan knows that the geometry effects the radiation pattern. Such a result is expected, particularly when providing multiple loops about the housing 122.

Regarding the argument to Claim 29 in the third paragraph on page 10 of the Brief, the Amundson patent was shown to provide a loop type radiator in the same environment as that claimed. Evidence of obviousness is shown since the implantable medical device is used for the stimulation claimed here.

Regarding the arguments for Claim 24 found on pages 10-12, labeled section "E", Appellant emphasizes the critical elements in bold. Villaseca does show a first fold, where the inner conductor is within the shielded or braid section. The outer layer of the braid is in a plane different but parallel to the inner conductor. The inner conductor has a plane that is parallel but separated from the plane of the outer shield. Since the planes are coaxial, then they are parallel. Such is a fair reading and is not beyond the broadest reasonable interpretation because given any collection of points on the shield, for example above and below the inner conductor in Fig. 7, the conductors do exist in exclusive plans. The claim does not preclude any number of points on the tubular shield that might share the plane of the inner conductor. It must be recognized that the claim recites "arcuate portions". Such portions are all that is required to meet the language recited here.

As to the argument in the first paragraph on page 12 of the Brief, a skilled artisan recognizes as obvious that the curved antenna arrangement in Fig. 7 of Villaseca is for the purpose of providing an antenna that conforms to the shape of the housing, bent

around it so as not to project from the protective dielectric housing 138. Compare with Figures 6A, 8 and 9, which all show the antenna projecting beyond the geometry of the housing. Figure 7 of Villaseca is used in the same manner as Appellant in order to conform to the housing geometry.

Section “F” of the Brief, pages 12-13 concerns the arguments for Claims 33-38 and the first paragraph therein, emphasize in bold, the different elements of the claimed antenna arrangement. As pointed out above, a skilled artisan would have found it obvious that the coaxial cable internal the housing has two conductors connected to the RF output connections of the transceiver circuitry. Villaseca suggests in the Fig. 8 embodiment, as similar to the Fig. 7 embodiment, that the cable extends within the housing. Two conductors connect to the RF circuitry in the transceiver, the shield is connected to the housing at feedthrough 146 or 126. This is the requirement of the claim, for example Claim 33, where the shield of the coax is simply connected to the feedthrough, and therefore such a limitation is fully met by this electrical connection. Any ground loops are eliminated when good engineering principles are applied by employing ground connections to the circuitry and any external circuitry such as an antenna and grounded housing.

Regarding the arguments in the first full paragraph on page 13 of the Brief, Appellant assumes that the braid shield 124 is not part of the radiating antenna. However, it is because it is a resonant portion projecting above the housing along with the length of the housing provides the second leg of the antenna, where the first is the inner conductor projecting from the braid. The length of the braid is an odd multiple of the

center conductor length and therefore forms a part of the radiator. Radiation currents are induced in the braid and therefore define the radiator portion along with the center conductor. A skilled artisan would have found it obvious that the dimension of the braid provides for radiation outside of the dielectric housing 138 and that it only shields the inner conductor along its length but does not prevent radiating currents from flowing thereon in opposite directions. The phase of the currents is opposite between the two conductors but aids in radiation therefrom.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Michael C. Wimer

Primary Examiner

GAU 2821

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